

# (12) UK Patent Application (19) GB (11) 2 080 398 A

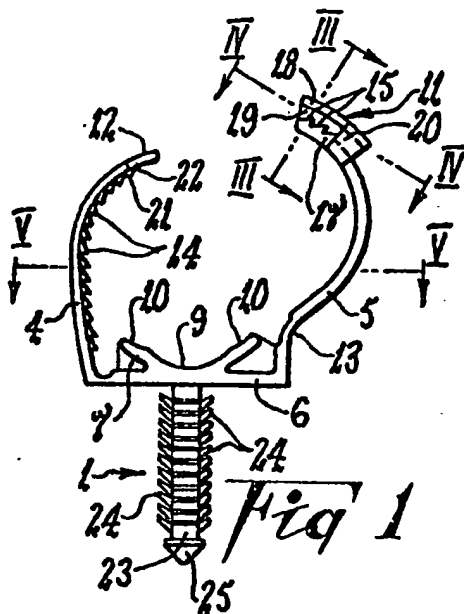
(21) Application No 8122279  
(22) Date of filing 20 Jul 1981  
(30) Priority data  
(31) 4639  
(32) 22 Jul 1980  
(33) Australia (AU)  
(43) Application published  
3 Feb 1982  
(51) INT CL<sup>3</sup>  
F16B 2/08  
(52) Domestic classification  
E2A 110 120 122 414 AS  
(56) Documents cited  
GB 1567852  
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GB 1079888  
GB 1014768  
(58) Field of search  
E2A  
(71) Applicants  
W. A. Deutscher  
Proprietary Limited,  
600 South Road,  
Moorabbin, Victoria 3189,  
Australia  
(72) Inventor  
John Douglas Wright

(74) Agents  
Gill Jennings & Every,  
53—64 Chancery Lane,  
London WC2A 1HN

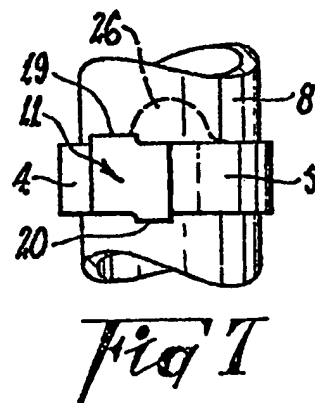
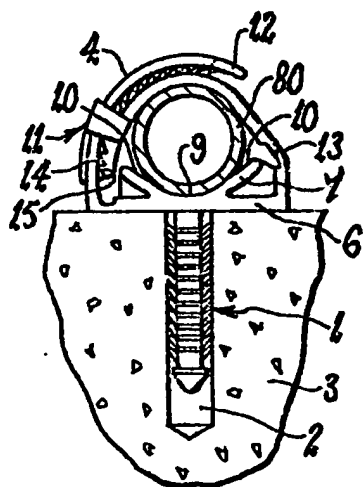
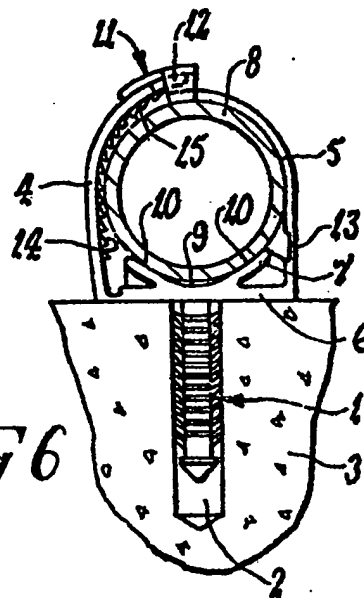
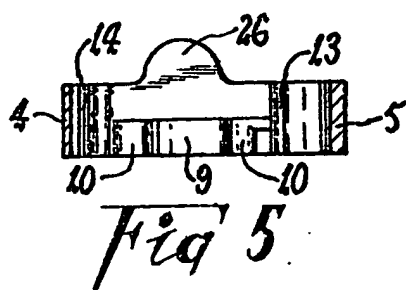
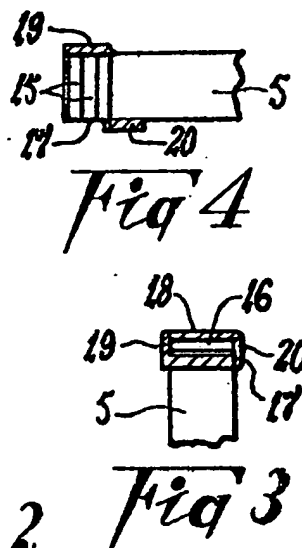
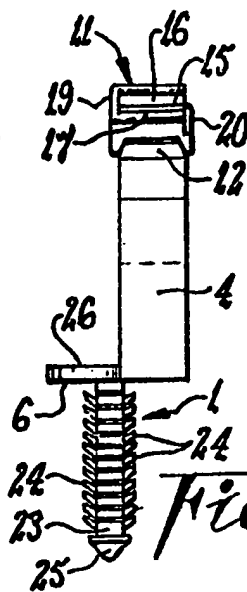
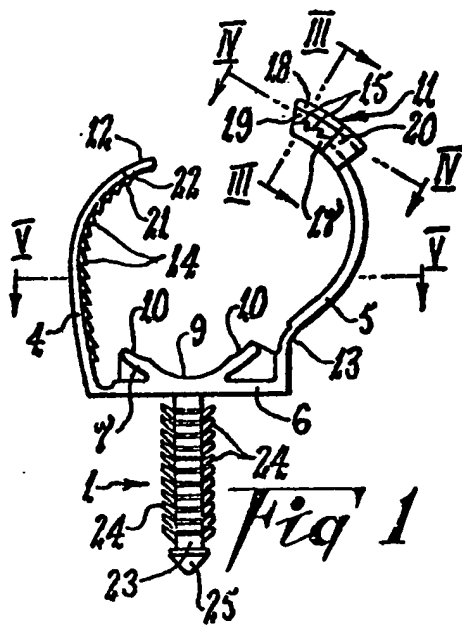
## (54) Band clamps

(57) A one-piece plastics band clamp includes a stem 1 to be inserted into a hole in a support, two strap members 4 and 5 attached to one end of the stem 1 and extending therefrom in spaced relationship, with locking means 11 on the end of strap member 5 remote from the stem 1. The locking

means 11 includes an open-ended passage having ratchet teeth 15 therein, and the other strap member 4 has a plurality of ratchet teeth 14 complementary to the ratchet teeth 15 for engagement therewith in any one of a plurality of relative positions to retain cables, conduits or the like of different sizes and cross-sections, circular cross-sections being preferably additionally located by a saddle 7. The stem 1 preferably has a core with four longitudinal rows of flexible fins 24 and may be located on a head 6, offset from the side of the clamp.



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## SPECIFICATION

### Retaining clips

This invention relates to a retaining clip for use with elongate members such as wire, cable, rod, conduit and the like. In use, such clips retain the associated elongate member in assembly with a support. Such clips will be hereinafter referred to as retaining clips of the kind indicated and it will be convenient to describe the invention with particular reference to a clip for retaining conduit in assembly with a support structure. The clip however, has other applications as referred to above.

It is an object of the invention to provide a retaining clip which may be readily secured to any of a variety of supports — e.g., concrete, brick, masonry, wood, metal or other supporting structures. It is a further object of the invention to provide a retaining clip which may be used for holding in position conduits or the like of a range of cross-sectional sizes. The conduit may be circular or of any other cross-sectional shape.

Another object is to provide a retaining clip which may be fitted in position and then clamped about a conduit or the like in a single-handed operation.

According to the present invention there is provided a retaining clip of the kind indicated including a stem adapted for insertion into a hole provided in a support, two strap members attached to one end of said stem and extending therefrom in spaced relationship, locking means on one of said strap members at the end portion thereof remote from said stem, the other said strap member being engageable with said locking means in any one of a plurality of relative positions whereby said interengaged strap members enclose a space the size of which varies according to which of said relative positions is selected.

The essential features of the invention, and further optional features are described in detail in the following passages of the specification which refer to the accompanying drawings. The drawings however, are merely illustrative of how the invention might be put into effect, so that the specific form and arrangement of the features (whether they be essential or optional features) shown is not to be understood as limiting on the invention.

In the drawings:

Figure 1 is an elevational view of a retaining clip according to one embodiment of the invention.

Figure 2 is a side elevational view of the clip shown in Figure 1.

Figure 3 is a sectional view taken along line III—III of Figure 1.

Figure 4 is a sectional view taken along line IV—IV of Figure 1.

Figure 5 is a sectional view taken along line V—V of Figure 1.

Figure 6 shows the clip of Figure 1 attached to a support and retaining a conduit.

Figure 7 is a plan view of the assembly shown

in Figure 6.

Figure 8 is a view similar to Figure 6 but showing the clip retaining a smaller conduit.

The retaining clip shown in the drawings includes a stem 1 which is adapted to fit within an appropriate hole 2 formed in a support 3 (Figure 6) so as to be firmly attached to that support 3. Two strap members 4 and 5 are formed integral with one end of the stem 1 and extend away from the stem 1 in spaced relationship. As shown, the strap members 4 and 5 extend generally in the longitudinal direction of the stem 1 and are attached to the stem 1 through a plate-like head section 6 which projects laterally outwards of the stem 1. Furthermore, as shown in Figure 2, the strap members 4 and 5 are attached to the head section 6 so as to be laterally offset relative to the stem 1.

In the preferred construction shown, a saddle 7 is provided on the head section 6 at a location between the adjacent ends of the two strap members 4 and 5. The saddle 7 provides a support for a conduit 8 (Figure 6) or the like and has a concave curved seating surface 9 for that purpose. A further two curved seating surfaces 10 may be provided at each end of the surface 9 and, as shown, they have a radius of curvature greater than that of the surface 9. The surfaces 9 and 10 thereby provide a seat for small and large conduits 80 and 8 respectively as shown in Figures 8 and 6.

The strap members 4 and 5 are preferably of arcuate shape as shown in Figure 1 so that when they are inter-engaged — i.e., the strap member 4 passes through a locking buckle 11 of the strap member 5 — the terminal end portion 12 of the strap member 4 will remain closely adjacent the outer surface of the strap member 5 (Figure 8). The strap members 4 and 5 may have some flexibility to accommodate conduits of various sizes and it is preferred to attach the strap member 5 to the head section 6 through a flexible hinge portion 13 (Figure 1). It will be appreciated that such a hinge portion may be provided for the strap member 4 as an alternative to or additional to the hinge portion 13.

Locking interengagement between the two strap members 4 and 5 is achieved through co-operative locking teeth 14 and 15 provided on the strap members 4 and 5 respectively. As shown by Figures 6 and 8, the two strap members 4 and 5 can be locked together in any one of a plurality of relative positions such that the space enclosed by those members can be varied in size. The teeth 15 are provided within the locking buckle 11 and that buckle defines an open ended passage 16 (Figure 3) through which the strap member 4 can pass.

As seen more clearly from Figures 1, 3, and 4 the locking buckle 11 is formed by an end portion 17 of the strap member 5, a cover part 18 which overlies and is spaced from the end portion 17 and a pair of side walls 19 and 20 located on respective opposite sides of the end portion 17. The side walls 19 and 20 interconnect the end

portion 17 and cover part 18 and are offset from one another so that there is substantially no overlap between them when viewed at right angles of the longitudinal axis of the strap member 5 (Figure 4). That offset relationship of the side walls 19 and 20 is significant in that it allows the clip to be made by a two-part moulding die thereby greatly simplifying manufacture.

Each of the locking teeth 14 and 15 is formed to provide secure retention against withdrawal of the strap member 4 from the locking buckle 11 but to permit progressive movement of the strap member through the buckle 11 to enable selection of the correct relative position according to circumstances. For that purpose, each tooth 14 and 15 extends transverse to its respective strap member 4 and 5 and has a sharp abutment surface 21 and a sloping ramp surface 22 (Figure 1). In the locked condition, the abutment surface 21 of engaging teeth 14 and 15 are in face to face engagement.

The teeth 14 may be provided along substantially the full length of the strap member 4. The teeth 15 however, are preferably provided only on the strap end portion 17 so as to be limited to the area beside the side wall 19. The teeth 15 could be continued further along the strap member 5, but the arrangement shown is convenient for manufacturing purposes.

Furthermore, only one tooth 15 could be satisfactory under some circumstances. If desired, the teeth 15 could be provided on the inner surface of the cover part 18 in which event the teeth 14 would be provided on the surface of the strap member 4 opposite to that shown.

In the preferred embodiment of the invention as shown in the drawings, the stem 1 is made in accordance with the principles set out in Australian Patent No. 470951 corresponding to British Patent No. 1 451 009. That is, the stem 1 includes a core section 23 and four rows of fingers 24, each row extending in the length of the stem 1. The rows of fingers 24 on two opposite sides of the stem 1 are offset relative to the rows on the other two opposite sides, and the core section 23 is circular in cross-section. The fingers 24 are flexible so as to be capable of deflection inwards towards the core section 23.

The clip may be readily made by moulding of a suitable thermoplastic material such as moisture conditioned U.V. stabilised "Zytel" 408 (Registered Trade Mark), or any suitable polyamide. It may be made in any desired colour and, in fact, a range of colours may be provided to suit different usages, and made to suit requirements of electrical insulation.

The retaining clip will accommodate a range of different sizes of conduit and, indeed, will accommodate non-circular articles as well as those of circular cross-section. The provision of the saddle 7 aids in holding the conduit in position.

In use, a hole 2 is provided in the support 3, at a desired location and of a diameter to receive and be gripped by the stem 1 of the clip. The front end

25 of the stem 1 is inserted in the hole 2 and the stem 1 can then be driven into position by a light blow of a hammer or other suitable tool against the exposed upper surface 26 of the head section 6. The offset relationship of the strap members 4 and 5 and the saddle 7 facilitates that driving operation. The conduit 8 (Figure 6) or 80 is placed so that it rests against the saddle 7 and the two strap members 4 and 5 are interengaged so as to lock the conduit 8 or 80 in position.

Since the retaining clip is made in one-piece it is very convenient to fit in position and to operate to secure a conduit in position. In fact, it can be driven into position and secured around a conduit by single handed operation.

It is to be understood that many modifications in details of design and construction may be made without departing from the broad ambit of the invention as defined by the appended claims.

## 85 CLAIMS

1. A retaining clip of the kind indicated including a stem adapted for insertion into a hole provided in a support, two strap members attached to one end of said stem and extending therefrom in spaced relationship, locking means on one of said strap members at the end portion thereof remote from said stem, the other said strap member being engageable with said locking means in any one of a plurality of relative positions whereby said interengaged strap members enclose a space the size of which varies according to which of said relative positions is selected.

2. A retaining clip according to Claim 1, wherein said locking means includes an open ended passage for receiving said other strap member, said passage being defined between said end portion of said one strap member, a cover part overlying and spaced outwardly from said end portion and two side walls located on respective opposite sides of said end portion and interconnecting that end portion and said cover part, the two side walls being relatively offset so that there is substantially no overlap between those side walls when viewed at right angles to the longitudinal axis of said one strap member.

3. A retaining clip according to Claim 2, wherein at least one locking tooth is provided within said passage, a plurality of locking teeth are provided on said other strap member in spaced relationship along the length of that strap member, and the respective locking teeth of the two said strap members are interengageable so as to resist withdrawal of said other strap member from said passage.

4. A retaining clip according to Claim 3, wherein each said locking tooth extends transverse of its respective strap member and is defined by a sharp abutment surface and a sloping ramp surface, the abutment surfaces of the locking teeth of the respective strap members engage to provide said resistance to withdrawal, and said ramp surfaces co-operate to permit said other strap member to be moved further through

said passage.

5 5. A retaining clip according to any preceding claim, wherein said stem has a core section and a plurality of rows of fingers provided on that core section, each said row extends in the longitudinal direction of said stem and each said finger is flexible such that it can be deflected inwards towards said core section.

10 6. A retaining clip according to any preceding claim, wherein a head section is attached to said one end of the stem and projects laterally of said stem, and said strap members are attached to said head section so as to be laterally offset from the longitudinal axis of said stem.

15 7. A retaining clip according to Claim 6, wherein a saddle is provided on said head section and has a concave curved seating surface which

faces away from said stem in the longitudinal direction thereof.

20 8. A retaining clip according to Claim 7, wherein said saddle is located between the adjacent ends of the two said strap members.

25 9. A retaining clip according to Claim 7 or 8, wherein said seating surface is located between two further seating surfaces which are also of concave curvature but have a larger radius of curvature than that of the first said seating surface.

30 10. A retaining clip according to any preceding claim, formed as a one piece unit.

11. A retaining clip constructed and adapted to function substantially as herein particularly described with reference to what is shown in the accompanying drawings.